TITLE OF INVENTION

Hand Held Remote Cover

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] Not Applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable

BACKGROUND OF THE INVENTION

1. Field of Invention

[0003] This invention pertains to a sheath for covering hand-held devices and more particularly concerns a sheath configured for enclosing a hand-held device having controls thereon in a manner to facilitate a user's manipulation of the controls on the enclosed hand-held device.

2. Description of the Related Art

[0004] Modern hospital facilities and walk-in medical clinics require disinfection of surfaces and devices utilized in a medical treatment room or in a recovery room to minimize the spread of infectious diseases. A

multitude of hand-held auxiliary devices may require covering with a sterile sheath when the device is utilized to remotely control medical equipment such as adjustable beds, video display units for viewing surgical procedures, ultrasound power units, and/or television units utilized by the medical staff or utilized by the patient during post-operative recovery. Moreover, certain investigatory medical probes having controls thereon must be enclosed by a sterile cover before use to guard against contamination.

[0005] Prior art devices have involved covering a hand-held device with a generally planar film of material, or inserting a medical probe into a sheath of material having generally planar sides. These hand-held devices or medical probes often includes one or more controls positioned on their exterior surface. No prior art sheath of this type is known which provides adequate accommodation for the manipulation of the buttons, calibrating dials, or adjusting knobs, frequently associated with these devices. Thus, in the prior art there exists a potential for tearing of the film exists when attempting to manipulate the button, dial, or knob. For a device or probe having controls protruding from opposing sides of the device, the opposed side controls can unduly stretch the planar sides of the sheath when the device or probe is inserted into the sheath. Stretching of the sheath sides poses an increased risk of tearing the

sheath material during insertion of the device or probe into the sheath and/or during manipulation of the controls.

[0006] Moreover, there is an absence of tactility when seeking to operate the control of a device or probe which is enclosed in a straight sided sheath.

BRIEF SUMMARY OF THE INVENTION

[0007] According to one embodiment of the present invention, a sheath is disclosed for covering a manually manipulated controller having at least one accessible button control and/or at least one rotary control projecting from one of the exterior surfaces of the controller. The sheath, when viewed in a flat plan view, includes top and bottom flexible panels, each formed from a flexible and substantially transparent film, the panels having like contoured perimeters. The top and bottom panels are overlaid one upon the other with their respective contoured perimeters in register, and are bonded further to one another along the respective overlaid nose segments and respective linear side portions.

[0008] Each contoured perimeter includes a rounded first closed end or nose segment and first and second opposite generally linear side edges extruding from the nose segment to an open end of the sheath.

One of the linear side edges of each of the top and bottom panels includes a shoulder portions interposed along the length of a respective side edge. The like-configured shoulder portion of the top and bottom panels are in register when the top and bottom panels are overlaid one upon the other, thereby defining a lateral pouch along the side edge of the sheath (when the sheath is opened). The lateral pouch is adapted to receive therein a manually manipulated controller which projects from a side surface of the device or probe. To accommodate the insertion of the projecting controller of a device or probe, in the preferred embodiment, that portion of the sheath between its open end and its shoulder is of a larger diameter (when open) than the diameter of the sheath between its nose portion and its shoulder. This structure permits close fitting of the distal end of the device and the nose portion of the sheath.

[0009] In a preferred embodiment each shoulder portion defines a scalloped interruption of its respective linear side portions. The scallops of each interruption exhibits enhanced tactility of the respective surfaces and enhanced expansibility in excess of the expansibility of the uninterrupted portions of a side edge of the sheath for the receipt therein of at least one button control or the rotary control of the hand-held controller when the controller is disposed within the sheath. The preferred scalloped interruption includes multiple scallops, hence defines

a plurality of interconnected relatively small pouches when the sheath is expanded. Such plurality of pouches collectively provide a three-dimensional expanse of the sheath for receiving a controller of a device or probe. These structures provide for ease and precise manipulation of controller plus minimization of the chance of tearing of the sheath material covering the controller.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0010] The above-mentioned features of the invention will become more clearly understood from the following detailed description of the invention read together with the drawings in which:

Figure 1 is a plan view of a sheath of the present invention, illustrating the sheath in profile and secured to a carrier;

Figure 2 is a sectional view taken along line 2-2 in Figure 1, illustrating the lower side edges of the sheath bonded to the carrier;

Figure 3 is a perspective view of the sheath of the present invention, illustrating insertion of a hand-held controller into the sheath;

Figure 4a is a side view of Figure 3, illustrating the controller having a rotary control covered by a contoured shoulder of material;

Figure 4b is a close-up side view of Figure 4a, illustrating the contoured shoulder of material expanded to cover the rotary control; and

Figure 5 is a plan view of Figure 1, illustrating an alternate embodiment of a sheath having opposed contoured shoulders covering opposed rotary controls on the controller.

DETAILED DESCRIPTION OF THE INVENTION

[0011] A sheath **10** of flexible material is disclosed for covering a hand-held controller device **70** having a plurality of controls **72**, **74** thereon which require manipulation by an operator for utilization of the device **70**. The sheath **10** is releasably secured along a portion of its perimeter **22** to a carrier **80** as illustrated in Figure 1. The sheath **10** is released from the carrier **80** during positioning of the controller device **70** therein to provide a sterile layer covering the controls **72**, **74** of the device **70** during manipulation by the operator.

[0012] The sheath **10** is composed of at least one layer of flexible material having a top panel **12** and a like-configured bottom panel **12'** as illustrated in cross-section in Figure 2. The top and bottom panels **12**, **12'** are configured to include a rounded first end identified as a nose segment **14**, and first and second opposite side edges extruding from the

nose segment **14** to a second end identified as an open end **68**. The thickness of the sheath material is selected to provide a preferred flexibility for the sheath **10** to encircle the controller device **70** while providing a desired strength in order to withstand tearing during repetitive manipulation of the sheath material covering one or more controls **72**, **74**. The thickness of the sheath material is selected from a thickness ranging between about 0.5 mils to about 2.0 mils. Examples of the sheath material include a poly-ether urethane, a sterilizable polymer material such as a hybrid plastic such as metalacine plastic, or a similarly pliable and sterilizable polymer material. The sheath material is preferably transparent, allowing visual accessibility for observing the hand-held controller **70** positioned therein.

[0013] The rounded nose segment **14** includes a contoured perimeter **22** that is sealed along the edges to form a closed first end. The nose segment **14** provides a first width of sheath material that extends between opposed generally linear side portions **18**, **20** to respective second end corners **16**, **16'**. The first width of sheath materials is of a sufficient width to accept the typical controller device **70** therein. A first linear side portion **18** extends from the rounded nose end to the second end corner **16** proximal of a first shoulder segment **52**. A first linear edge **28** is formed by bonding the first side portion of the top

panel **12** aligned in register with a like-configured first side portion of the bottom panel **12'**. A second linear side portion **20** extends from the rounded nose end to a second end corner **16'** proximal of a second shoulder segment **56**. A second linear edge **30** is formed by bonding the second side portion of the top panel **12** aligned in register with a like-configured second side portion of the bottom panel **12'**. Sealing of the edges of the nose end and first and second side portions **18**, **20** of the top and bottom panels **12**, **12'** is accomplished by means for bonding along the contours of the respective edges of the respective linear side portions and respective shoulder portions of the overlaid panels aligned in register. The means for bonding can be accomplished by heat welding, ultrasonic welding, or other means known to those skilled in the art for bonding panels of flexible material together along aligned panel edges.

[0014] In one embodiment, the shoulder segment **50** forms a transition segment at approximately the mid-portion of the length of the sheath **10**. A first shoulder segment **52** is disposed to extend laterally from the second end corner **16** of the nose segment **14**, to the first end **34** of the third linear side portion **38**. The first shoulder segment **52** includes an arcuately scalloped edge as illustrated at **54** in Figures 1 and 3. The scalloped edge **54** defines a convoluted edge having curved extensions and providing a scalloped interruption of its respective linear

side portions **18**, **38** of flexible material as viewed in profile (see Figs. 1 and 3). The scalloped edge **54** exhibits enhanced expansibility in depth as illustrated in Figures 4a and 4b that is in excess of the minimal expansibility of an uninterrupted portion of a second shoulder segment **56** (see Fig. 1). The expansibility of the scalloped edge **54** is provided by a gathering of flexible sheath material that defines a plurality of interconnected and relatively small lateral pouches along the first shoulder segment **52** when the sheath **10** is expanded. Such plurality of pouches collectively provide a three-dimensional expanse of the first shoulder segment **52** adapted to receive therein a manually manipulated rotary control **74** projecting from a side surface of the controller **70**.

[0015] The improvements provided by the scalloped edge **54** include an increased tactility of the flexible sheath material as compared to straight sided sheath coverings, thereby allowing the user to readily and precisely manipulate **78** the rotary control **74** covered by the plurality of pouches along the scalloped edge **54** (see Figs. 3, 4a, and 4b), while minimizing the chance of tearing of the sheath material during repetitive manipulating of controls. Alternatively, the scalloped edge **54** is positionable over a switch or "push/pull" buttons **72** on the controller **70**, with the expansibility of the scalloped edge **54** allowing a user to repetitively grip and manipulate the buttons **72** without tearing the

flexible material enclosing the controller **70**. As further illustrated in Figure 5, the gathering of flexible materials along the scalloped edge **54** allows the sheath material to be manipulated **60** longitudinally and/or laterally relative to the controller **70**".

[0016] The second shoulder segment **56** includes an angled edge **58** that forms an uninterrupted angled linear transition between the second end corner **16'** and a first end **34'** of the fourth linear side portion **40**. The angled edge **58** can be linearly angled at between about thirty degrees to about fifty degrees directed inwardly toward the nose segment **14**. A preferred angle for the angled edge **58** is about forty-five degrees directed inwardly toward the nose segment **14**. The scalloped edge **54** and the angled edge **58** provide a transition for a reduced diameter of the nose segment **14** of between about three to about four inches, compared to a greater diameter of between about four inches to about five inches for the lower segment **32** and open end **68**. Alternative diameters for the nose segment **14** and the lower segment **32** and open end **68** are readily provided. The greater diameter of the lower segment **32** compared to the reduced diameter of the nose segment **14** permits close fitting of the distal end of a controller **70** within the nose segment of the sheath **10**. The edges of the open end **68** are not bonded together although the top and bottom panel edges are collapsible together to enclose a controller

70 while allowing a wiring cord **70'** extended from the controller **70** to exit between the collapsed edges of the open end **68**.

[0017] The sheath **10** includes a lower panel segment **32** having side boundaries of a third linear side **38** and a fourth linear side **40**. The third linear side **38** is extended from a first end **34** adjacent the first shoulder segment **52**, to a second end corner **42** of the open end **68**. The third linear side **38** is sealed by the means for bonding to form a third side perimeter **46** by the means for bonding along the edge contours of respective sides of the overlaid panels **12**, **12'** aligned in register. The fourth linear side **40** is extended from a first end **34'** adjacent second shoulder **58**, to a second end corner **44** of the open end **68**. The fourth linear side **40** is sealed by the means for bonding to form a fourth side perimeter **48** along the edge contours of the respective sides of the overlaid panels **12**, **12'** aligned in register.

[0018] An alternative embodiment of the sheath **10** is illustrated in Figure 5, including a second shoulder segment **56'** having a convoluted profile of material such as a scalloped edge similar to the first shoulder segment **52**. As discussed herein for the first scalloped edge **54**, the second shoulder segment **56'** includes a second scalloped edge **66** having a gathering of flexible material that is manipulated **60** similar to first

scalloped edge **54**. The second scalloped edge **66** is expansible longitudinally and laterally and provides a gathering of flexible sheath material that defines a plurality of interconnected relatively small pouches similar to first scalloped edge **54** (see Fig. 4b) that collectively provide a three-dimensional expanse of the sheath **10** for receiving therein a controller device **70"** or a medical probe. The plurality of interconnected small pouches along the opposed scalloped edges **54**, **66** provide for enhanced tactility of the respective surfaces **54**, **66** for precise manipulation of respective controls **74'**, **76'** while minimizing the chance of tearing of the sheath material. The scalloped edges **54**, **66** of each interruption also exhibit enhanced expansibility in excess of the expansibility of the uninterrupted portions of a side edge of a planar sheath, thereby allowing for receipt therein of a rotary control **74** or respective controls **74'**, **76'** of a controller of significant width and depth when disposed within the sheath **10**. In addition, the expansibility of the plurality of pouches allow manipulation inwards and outwards **62** of a toggle control **76'** mounted on the side of the controller **70"**. As illustrated in Figure 5, each respective side control **74'**, **76'** is preferably positioned proximally interior of the respective pouches defined by the respective scalloped edges **54**, **66**. The flexible sheath material along the open end **68** is not bonded together and is collapsible upon itself to

enclose a base portion **70"** of a battery operated remote controller **70"** lacking a power cord (see Fig. 5).

[0019] To provide a tubular sheath **10** which is readily stored without destructive folding, and is rapidly dispensed without binding when needed, the two overlaid panels **12**, **12'** are aligned with their respective contours in register and are releasably mounted along the sheath outer perimeter onto a generally planar carrier **80**. The carrier **80** includes first end **84**, second end **84'**, and a receiving surface **82** extended therebetween for receiving the sheath **10** in an elongated position thereon. The receiving surface **82** is preferably fabricated from paper stock having a gloss finish thereon. The receiving surface **82** includes a polymer material encapsulated thereon, onto which the sheath **10** is releasably secured along its perimeter. The back side **88** of the carrier **80** is fabricated of paper stock that may have a gloss finish thereon, or may be fabricated without a gloss finish. The carrier **80** having at least one sheath **10** mounted thereon is readily stacked on additional like-configured carriers **80** having at least one sheath mounted thereon for enclosure within a storage package (not shown). The sheath **10** is releasably secured to the carrier **80** by means for bonding know to those skilled in the art. The method of mounting can include heat welding, ultrasonic welding, or other means known to those

skilled in the art for releasably sealing a flexible polymer material along a perimeter **22** to a carrier **80** composed of flexible paper stock material. The heat welding or ultrasonic welding generates small amounts of melted sheath material that releasably seals the perimeter **22** to the carrier **80**. The sheath open end **68** is preferably not bonded to the carrier **80** to allow release from the flexible carrier **80** during a step of enclosing a hand-held controller **70** inserted into the open end **68**(see Fig. 3). When the sheath **10** is removed from the flexible carrier **80** and rotated about ninety degrees about the sheath's lengthwise axis, the sheath side profile is generally planar for the overlaid panels **12**, **12'** when bonded together. The generally planar panels **12**, **12'** allow the sheath **10** to have a substantially flat configuration when mounted onto the carrier **80** and allows a plurality of like-configured sheaths individually mounted on flexible carriers to be assembled in a layered and stacked configuration within a portable storage receptacle (not shown). The portable storage receptacle also serves as a dispensing means that maintains each sheath **10** and carrier **80** in a generally contaminant-free enclosure while allowing for rapid dispensing of each sheath **10** and carrier **80** from the receptacle for use by medical personnel.

[0020] A method of utilization is disclosed for enclosing a hand-held

controller **70** within a flexible sheath **10**. The method includes inserting a first end of the controller into the open end **68** of the sheath **10** mounted on the carrier **80**. As the controller **70** is inserted into the sheath **10**, the third and fourth side portions **38**, **40** are released from the carrier **80**. Upon completion of the step of inserting, the sheath **10** is completely released from the carrier **80** and at least one of the controls **72**, **74** is positioned proximal of the interior curvature of the first scalloped edge **54**. For a controller **70** having two opposed controls (see Fig. 5), each respective control **74'**, **76'** is positioned proximal of the interior curvature of respective scalloped edges **54**, **56'** of the sheath shoulder segment **50**. Upon completion of the step of positioning, the expansibility of the scalloped edges **54**, **56'** of the sheath **10** is utilized for a user to manipulate one or more controls **74'**, **76'** without tearing of the material of the sheath **10**.

[0021] Those skilled in the art will recognize that additional configurations of the hand held remote cover having alternative length and width configurations can be provided without departing from the spirit and scope of the present invention. While the present invention has been illustrated by description of several embodiments and while the illustrative embodiments have been described in considerable detail, it is not the intention of the applicant to restrict or in any way limit the scope

of the appended claims to such detail. Additional advantages and modifications will readily appear to those skilled in the art. The invention in its broader aspects is therefore not limited to the specific details, representative apparatus and method, and illustrative examples shown and described. Accordingly, departures may be made from such details without departing from the spirit or scope of applicant's general inventive concept.